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531 Rec'd PCT/ 14 JAN 2002

storage capacity.

A typical electrode structure is comprised of a conducting metal substrate coated with an active material mixture. For example, a typical negative electrode consists of a copper substrate coated with a mixture of graphite and a binder such as polyvinyl di-fluoride (PVDF). In accordance with the present invention, a lithium layer is deposited onto or into the electrode active material to reduce the amount of irreversible capacity by filling voids in the active material that do not participate in the reversible lithium ion insertion process.

In accordance with a preferred embodiment, lithium metal is first deposited onto a carrier, which is then used to transfer the lithium metal to the electrode structure by the application of heat, vacuum, and/or pressure. The carrier preferably comprises a long strip of plastic substrate that is preferable for a continuous transfer of lithium onto or into the electrode. In addition, this approach lends itself to commercial production. The substrate could be one of several materials such as ortho-polypropylene (OPP), Polyethylene Terephthalate (PET), polyimide, or other type of plastic. Lithium metal can be deposited onto or into one or both surfaces of the substrate. The lithium-coated plastic and the electrode material are then placed between two rollers or two plates. Lithium is transferred onto or into the electrode active material by applying heat and/or pressure in vacuum. In a preferred embodiment, the rollers or plates are

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heated in vacuum to about 120°C, or within the range of 25°C to 350°C, and a pressure of 50 kg/cm^2 to 600 kg/cm^2 is applied to the rollers or plates.

The speed of movement of the carrier electrode material through the roller pair or the plate pair is in the range of 10 cm/min. to 5 m/min. For a given speed, the length of time the materials are exposed to the heat and pressure rollers, or alternatively the heat and pressure plates, will be fixed, depending only on the lengthwise distance of the plate along the direction of the material movement. For the roller pair, deformation of the rollers results in distance in the direction of travel of the material, which adds to the actual contact time of pressure and temperature application.

The method could be used with electrodes having either single-sided coating or double-sided coating. In the double-sided coating method, both sides of the metal electrode substrate are coated with active material. The coated metal substrate is then sandwiched between two lithium-coated plastic carriers, with the lithium sides facing the active material on the coated metal substrate. All three sheets are then fed into a mechanism for applying heat and/or pressure in vacuum. As a result, lithium is transferred to both sides of the coated metal substrate.

The thickness of lithium transferred onto the electrode structure can be controlled to produce a lithium coating between about 50 Angstroms and

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